International Journal of Technological Exploration and Learning (IJTEL)
Volume 1 Issue 1 (August 2012)

An Automated Traffic Accident Detection and Alarm Device

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***Abstract*— The purpose of this work is to find the vehicle where it is and also you can stop that vehicle means after sending a message block you vehicle to your system which is placed inside of vehicle will get hold down there itself, until and unless authorized one comes and giving security code to that system and also most of the times we may not able to find accidents because we don't know where accident will happen, in order to give treatment for injured people first we need to know that where that happened through location tracking and sending to your related one when your there inside of vehicle. The process of working of is explained as follows, this total equipment of this work is placed in a vehicle. The authorized person details with mobile number and some predefined parameters are stored in the SMS or a missed-call to GSM modem from the authorized mobile after registering with the GSM modem. Then we can send a SMS to the modem to the vehicle. Whenever we find that our vehicle is missing then simply sends an SMS then vehicle will not move forward anymore. Then the microcontroller gets the location of vehicle found by the GPS modem and Accident of a vehicle is identified by using a sensor informs of a vehicle. Whenever the accident will happen the information will be sent to the GSM modem. This work is implemented on microcontroller based GSM communication.**

Keywords- GPS (Global Positioning System); GSM (Global Service for Mobile Applications); SMS (Short Message Service); Microcontroller.

I. INTRODUCTION

Now a day the vehicle accident rate has been increasing day by day, when compared to previous decade the theft rate has been increased by 54% in order to avoid this vehicle accident we have designed a system to provide security to the vehicles. Main aim of our work is to provide security to the vehicle in very reasonable cost so in this work we are using the basic microcontroller AT89C51 for cost effective and also for easy understanding. In this work we used assembly programming for better accuracy and GPS and GSM modules which helps use to trace the vehicle anywhere on the globe. Here we are using American 24 standard satellite system which consist of space segment, user segment and control segment to trace the vehicle perfectly using triangulation method and here GSM is used to send the exact location of the vehicle to our remote devices (mobile phone).here we use heat sensor(thermostat) to measure the engine temperature which gives the exact information that our vehicle is motion or in rest. Here relay is connected to fuel tank and whenever we find that our vehicle is missing then we send lock command relay automatically on the fuel lock and the buzzer which is connected to the relay automatically beeps this will threatens the thief and it blows until we send the POS command and then it indicates the accident position.

II. INTRODUCTION TO EMBEDDED SYSTEMS

Embedded System is a combination of hardware and software used to achieve a single specific task. An embedded system is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market.

An Embedded system is not a computer system that is used primarily for processing, not a software system on PC or UNIX, not a traditional business or scientific application. High-end embedded & lower end embedded systems. High-end embedded system - Generally 32, 64 Bit Controllers used with OS. Examples Personal Digital Assistant and Mobile phones etc .Lower end embedded systems. Examples Small controllers and devices in our everyday life like Washing Machine, Microwave Ovens, where they are embedded in.

A. System Design Calls

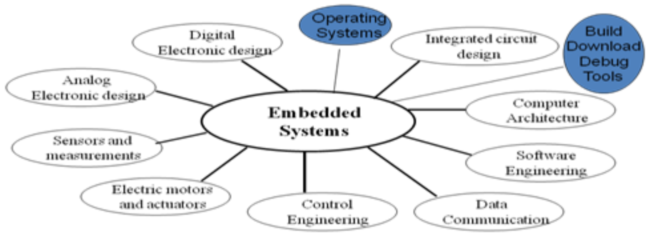

Figure 1. Embedded System Design Calls on many Discilplines

B. Introduction to GSM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz, It is estimated that many countries outside of Europe will join the GSM partnership. Cellular is one of the fastest growing and most demanding telecommunications applications.

Throughout the evolution of cellular telecommunications, various systems have been developed without the benefit of standardized specifications. This presented many problems directly related to compatibility, especially with the development of digital radio technology. The GSM standard is intended to address these problems. From 1982 to 1985 discussions were held to decide between building an analog or digital system. After multiple field tests, a digital system was adopted for GSM. The next task was to decide between a narrow or broadband solution. In May 1987, the narrowband time division multiple access (TDMA) solution was chosen. GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardwareThe GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS).

C. *Power Supply*

The power supply section is the important one. It should deliver constant output regulated power supply for successful working of our work. A 0-5V Vcc is used for our purpose; the primary of this power is connected in to main supply through on/off switch & fuse for protecting from overload and short circuit protection. The secondary is connected to the diodes convert from 12V AC to 12V DC voltage, which is further regulated to +5v, by using IC 7805.

III. SCHEMATIC DIAGRAM

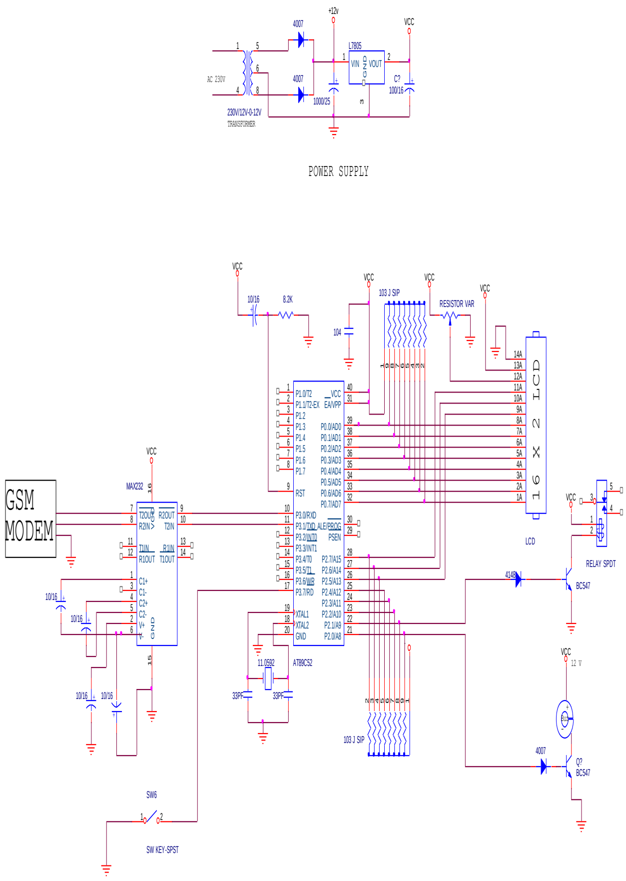

Figure 2. Schematic Diagram

A. *Micro Controller (AT89C52)*

The AT89C52 is 80C51 microcontrollers with 128kB Flash and 1024 bytes of data RAM.A key feature of the AT89C52 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramatically reducing the EMI.

The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible. The AT89C52 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running.

B. *Functional Description*

Power-On reset code execution

Following reset, the AT89C52 will either enter the Soft ICE mode (if previously enabled via ISP command) or attempt to auto baud to the ISP boot loader. If this auto baud is not successful within about 400 ms, the device will begin execution of the user code.

C. *In-System Programming (ISP)*

In-System Programming is performed without removing the microcontroller from the system. The In-System Programming facility consists of a series of internal hardware resources coupled with internal firmware to facilitate remote programming of the AT89C52 through the serial port. This firmware is provided by Atmel and embedded within each AT89C52 device. The Atmel In-System Programming facility has made in-circuit programming in an embedded application possible with a minimum of additional expense in components and circuit board area. The ISP function uses five pins (VDD, VSS, TxD, RxD, and RST). Only a small connector needs to be available to interface your application to an external circuit in order to use this feature.

Input/output (I/O) ports 32 of the pins are arranged as four 8-bit I/O ports P0–P3. Twenty-four of these pins are dual purpose with each capable of operating as a control line or part of the data/address bus in addition to the I/O functions. Details are as follows:

Port 0 : This is a dual-purpose port occupying pins 32 to 39 of the device. The port is an open-drain bidirectional I/O port with Schmitt trigger inputs. Pins that have 1s written to them float and can be used as high-impedance inputs. The port may be used with external memory to provide a multiplexed address and data bus. In this application internal pull-ups are used when emitting 1s. The port also outputs the code bytes during EPROM programming. External pull-ups are necessary during program verification.

Port 1: This is a dedicated I/O port occupying pins 1 to 8 of the device. The pins are connected via internal pull-ups and Schmitt trigger input. Pins that have 1s written to them are pulled high by the internal pull-ups and can be used as inputs; as inputs, pins that are externally pulled low will source current via the internal pull-ups. The port also

receives the low-order address byte during program memory verification. Pins P1.0 and P1.1 could also function as external inputs for the third timer/counter i.e.:

(P1.0) T2 Timer/counter 2 external count input/clockout

(P1.1) T2EX Timer/counter 2 reload/capture/direction control

Port 2: This is a dual-purpose port occupying pins 21 to 28 of the device. The specification is similar to that of port 1. The port may be used to provide the high-order byte of the address bus for external program memory or external data memory that uses 16-bit addresses. When accessing external data memory that uses 8-bit addresses, the port emits the contents of the P2 register. Some port 2 pins receive the high-order address bits during EPROM programming and verification.

Port 3: This is a dual-purpose port occupying pins 10 to 17 of the device. The specification is similar to that of port 1. These pins, in addition to the I/O role, serve the special features of the 80C51 family *B.*

D. ADC 0808

The function of an ADC is to produce a digital word which represents the magnitude of some analog voltage and current. Our application is using the type, Successive approximation ADC. Commonly available converters have analog multiplexers on their inputs. This allows the one converter to digitize any one of the 8 input signals. The in put channel to be digitized is determined by a 3-bit address applied to the address inputs of the device. An ADC with a multiplexer on its inputs is often called a data acquisition system, or DAS. In addition to the data lines, there are two other successive approximation ADC signals we need to interface to the microcomputer for the data transfer.

The first of these is a start convert signal which you output from the microcomputer to the ADC to tell it to do a conversion for you. The second signal is an EOC signal which the ADC outputs to indicate that the conversion is complete and that the word on the outputs is valid. If the time between input and output is more, then we use EOC signal. The OE signal is used to connect the output data lines. If it is grounded, the output will be zero.

The ADC 0808 is used as an 8-input DAS. You tell the device which input signal you want digitized with a 3-bit address you send to the ADC, ADB and ADA inputs. This 8-input device was chosen so that other control loops could be added later.

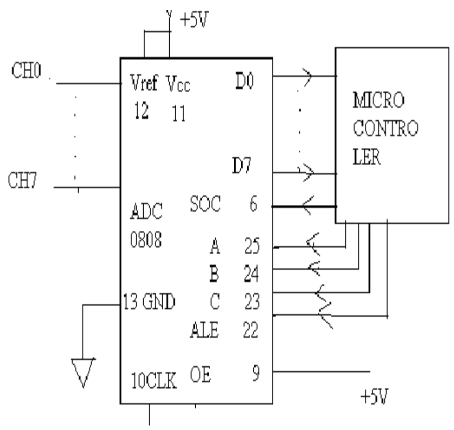

Figure 3. ADC 0808

The 555 timer will send an interrupt signal approximately once every second. An interrupt procedure is used to keep a count of how many interrupts have occurred. This count is equal to the number of seconds that have passed. In the mainline we setup stack and data segments. We initialize the data segment register, stack segment register, and stack pointer register as before. Each time, it receives an interrupt from the 555 timer; it executes the interrupt-service procedure for the interrupt. In this procedure we decrement the seconds count in the named memory location and test to see if the count is sown to zero yet.

E. DC Specifications

TABLE I. DC SPECIFICATION

SYMBOL	PARAMETER	TEST CONDITION: $V_{CC(V)}$	TEST CONDITION		VALUE (T_{in}54hc& 74 hc): Min	Type	Max	UNITS
V_{IH}	High level input voltage	2.0			1.5			V
		4.5			3.15			
		6.0			4.5			
V_{IL}	Low level input voltage	2.0					0.5	V
		4.5					3.15	
		6.0					1.8	
V_{OH}	High level out put votlage	2.0 4.5	Vi=Vh Or Vl	$I_{c=20\mu A}$	1.9	2.0		V
		6.0 4.5		$I_{C=6.0ma}$	4.4	4.31		
		6.0		$I_{C=7.8ma}$	5.6	5.8		
V_{OL}	Low level output voltage	2.0 4.5		$I_{c=20\mu A}$		0.0	0.1	V
		6.0		$I_{C=6.0ma}$		0.17	0.25	
		4.5 6.0		$I_{C=7.8ma}$		0.8	0.26	
I_L	Input leakage current	6.0	$Vi=v_{cc}$ or gnd				±0.1	uA
I_{OZ}	3-stage output Off-state current	6.0	$Vi=v_h$ or v_l $Vo=v_{cc}$ or gnd				±0.5	uA
I_{QC}	Quiescent supply	6.0						uA

IV. RS-232

Information being transferred between data processing equipment and peripherals is in the form of digital data which is transmitted in either a serial or parallel mode. Parallel communications are used mainly for connections between test instruments or computers and printers, while serial is often used between computers and other peripherals. Serial transmission involves the sending of data one bit at a time, over a single communications line. In contrast, parallel communications require at least as many lines as there are bits in a word being transmitted (for an 8-bit word, a minimum of 8 lines are needed).Serial transmission is beneficial for long distance communications, whereas parallel is designed for short distances or when very high transmission rates are required.

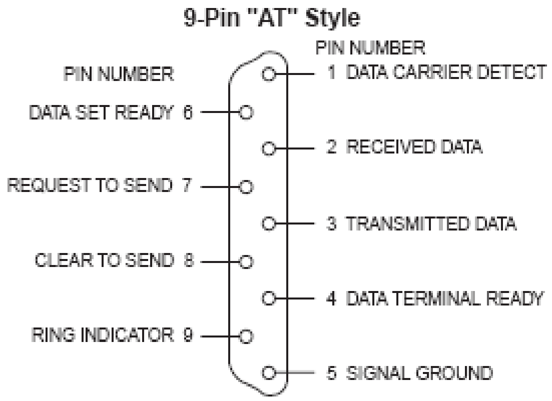

Figure 4. RS-2329-PIN

V. Kit Diagram

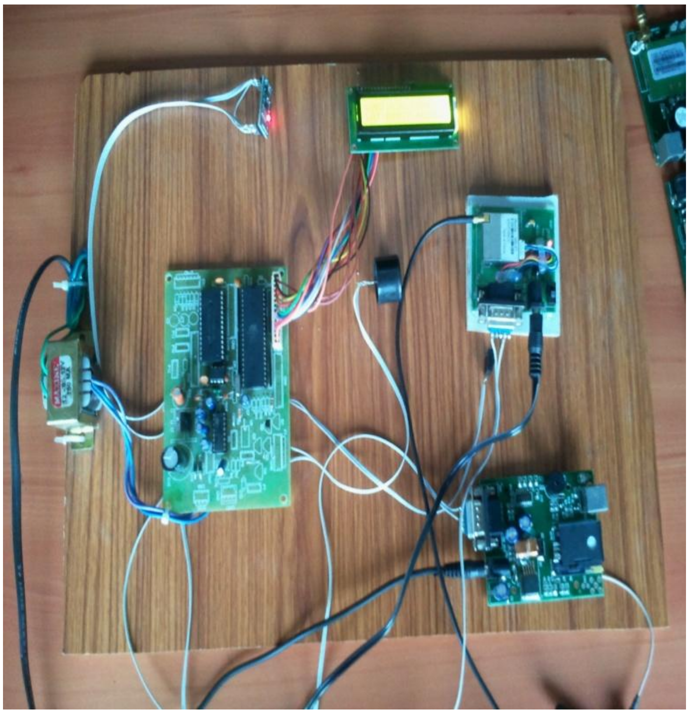

Figure 5. Kit Diagram

VI. CONCLUSION

An automatic alarm device for traffic accidents is designedin this paper. It can shorten the alarm time greatly and locatethe accident spot accurately, realizing the automation of accident detection and information transmission. Consequently, it will save the rescuers form wasting their time in search. The experiments of model car's collision and rollover proved that this system can automatically detect corresponding accident and sent related information. Such functions can be achieved by buttons representing "false alarm", "help" and "safety", respectively.

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